

MICROPROSTHEMA EMMILTUM, NEW SPECIES, AND
OTHER RECORDS OF STENOPODIDEAN
SHRIMPS FROM THE EASTERN PACIFIC
(CRUSTACEA: DECAPODA)

Joseph W. Goy

Abstract.—A new species of shrimp in the genus *Microprosthema* from the eastern Pacific is described and figured. Specimens have been collected from the Galapagos Islands, Panama, and the Gulf of California. The new species, *Microprosthema emmiltum*, represents a geminate or cognate species for it is closely related to the western Atlantic *M. semilaeve*. *Microprosthema emmiltum* is distinguished from *M. semilaeve* by slight morphological differences in abdomen, uropods, and spination of the pereopods as well as by coloration. A specimen of *Stenopus hispidus* is recorded from Taboga Island, Panama, bringing the total to five for species of stenopodidean shrimps found in the eastern Pacific.

While examining some unidentified stenopodid material from the National Museum of Natural History, Washington, D.C., I found two specimens of an undescribed *Microprosthema*, collected by the *Velero III* off Isla Santa Maria, Galapagos. Dr. M. K. Wicksten, while sorting specimens at the Allan Hancock Foundation, University of Southern California, found another specimen of the new species from off Taboga Island, Panama. Alex Kerstitch, an underwater photographer, sent Dr. Wicksten another specimen of this stenopodid with photographs of the animal in life.

While examining some stenopodid material in the collection of the Copenhagen University Zoological Museum, I found a male specimen of *Stenopus hispidus* collected by Mortensen in 1916 from Taboga Island, Panama. The banded coral shrimp, *Stenopus hispidus*, is widespread in tropical waters of the western Atlantic, Indian and western Pacific Oceans. The present record extends its known range into the eastern Pacific.

Microprosthema emmiltum, new species
Figs. 1-4

Material examined.—GALAPAGOS ISLANDS: ISLA SANTA MARIA (Florea or Charles Island), off Black Beach, 1°16'36"S, 90°29'42"W, *Velero III* sta 33-33, rocky shores, 27 Jan 1933, USNM 231363, female (holotype).—1°17'38"S, 90°29'55"W, *Velero III* sta 199-34, 30 Jan 1934, USNM 231364, ovigerous female (paratype).

PANAMA: TABOGA ISLAND, 8°47'35"N, 79°33'15"W, T. Mortensen, Apr 1916, AHF 161, ovigerous female (paratype).

MEXICO: BAJA CALIFORNIA, Los Friales, north of Cabo San Lucas, 23°23'N, 109°24'W, 9.1 m, rock and sand, hand net, under rock. Alex Kerstitch coll., 8 Jul 1981, AHF 8110, ovigerous female (paratype).

Diagnosis.—Moderately small stenopodidean shrimp with subcylindrical, depressed body, with few spinous processes; carapace covered with some small spines; third pereopod with minutely pitted surface giving

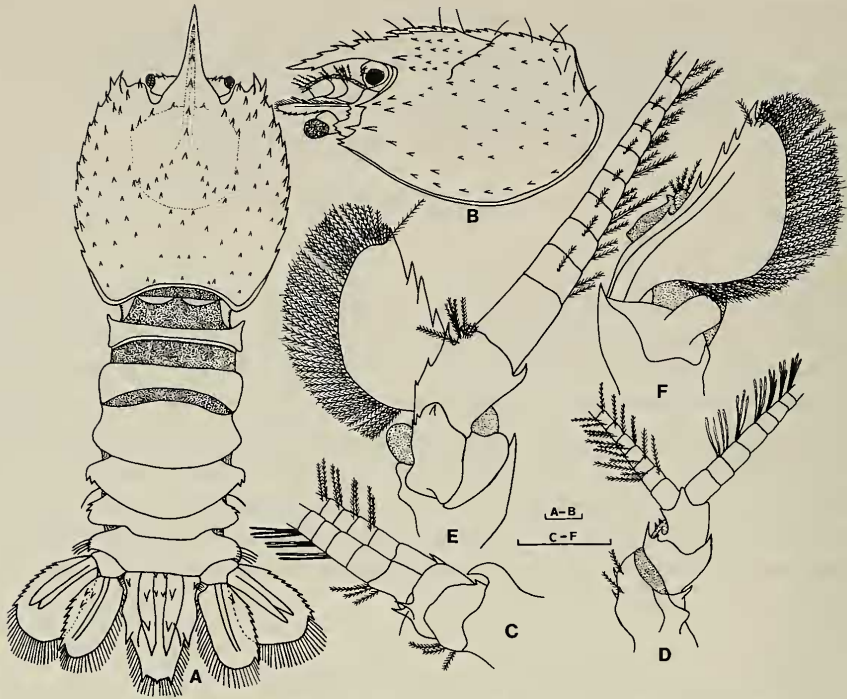


Fig. 1. *Microprosthema emmiltum*, holotype, female: A, Dorsal view; B, Carapace, lateral view; C, Antennule, dorsal view; D, Antennule, ventral view; E, Antenna and scaphocerite, ventral view; F, Antennal peduncle and scaphocerite, dorsal view. Scale bars represent 1.0 mm. Setules not shown on all setae for clarity.

scaly appearance, propodus with dorsal crista, numerous small spines dorsally and ventrally; dorsal surface of abdominal somites glabrous, pleura of last 3 abdominal somites ending in small spines; 1–3 spinules on dorsal surface of uropodal endopodite outside median ridge; scaphocerite lobate with 4–5 very strong teeth on outer margin; first maxilliped with 3-segmented endopodite; antennular and antennal flagella, fourth and fifth pereopods red; rest of shrimp white with appendages, carapace, and abdomen tinged with red.

Description.—Holotype (female, USNM). Rostrum (Fig. 1A, B) long, deflexed, nearly reaching level of distal end of scaphocerite. Dorsal margin with 5 strong spines, ventrally small spine, laterally without spines.

Carapace (Fig. 1A, B) covered with few long setae, scattered spinules, directed forward, placed in more or less longitudinal rows. Spinules most strongly developed an-

terodorsally, smallest posterodorsally. Three rows of 3–4 spinules in median region of carapace from base of rostrum to cervical groove. Cervical groove distinct with 4 spinules along each lateral margin. Large supraorbital, antennal, brachioestegal, and hepatic spines present. Two small pterygostomial spines present. Ventrolateral carapacial angle and posterior margin of branchiostegite rounded.

Abdomen (Fig. 1A) broad, depressed, dorsally glabrous, without transverse carinae or rows of tubercles. First 3 abdominal somites with posterior margin near base of pleura rounded. Pleura of fourth somite ending in 2 sharp teeth; bearing long seta laterally. Pleura of fifth somite ending in 1 blunt, 2 sharp teeth. Pleura of sixth somite ending in blunt tooth; 4 long setae laterally.

Telson (Fig. 1A) longer than uropods, truncately triangular. Dorsal surface with 2 longitudinal ridges, ending considerable

distance before posterior margin, bearing 3 strong teeth; middle teeth provided with long seta at outer part of base. Two pairs of spinules anteriorly in median groove; 2 small anterior submarginal spines present at telson base. Lateral margin at each side provided with large median lateral spine; posterior margin with 3 small spines; posterior $\frac{1}{2}$ of telson fringed with plumose setae.

Uropods (Fig. 1A) well developed, almost reaching tip of telson. Exopodite with outer margin slightly rounded, bearing 9–10 teeth; inner margin semicircular, fringed with plumose setae. Dorsal surface with 2 distinct longitudinal ridges without spinules. Endopodite subovate, outer margin with 7–8 teeth; inner margin fringed with plumose setae; dorsal surface with distinct unarmed median longitudinal ridge with 1–3 spinules outside ridge.

Eyes (Fig. 1A) well developed, cornea smaller, narrower than peduncle. Facets, pigment distinct in cornea. Ophthalmic peduncle dorsally with 2 spinules.

Basal segment of antennular peduncle (Fig. 1C, D) with distinct, sharply pointed, curved stylocerite. Basal, middle segments with some spinules. Both flagella short, provided with numerous plumose setae; upper flagellum with 63 aesthetascs, 2 on articles 2–3, 3 on articles 4–12, and 4 on articles 13–20.

Antenna (Fig. 1E, F) with strong basal segment; outer margin ending in acute spine; inner margin with distinct laminate process. Other segments of antennal peduncle with some spinules. Scaphocerite reaching slightly beyond tip of rostrum; lobate, rather narrow at base; outer margin slightly concave with 5 sharp, strong teeth; inner margin strongly convex, fringed with long plumose setae. Dorsal surface with distinct longitudinal carina, ventral surface glabrous. Antennal flagellum well developed, extending slightly beyond abdominal somites, covered with numerous short plumose setae.

Epistome (Fig. 2A) triangular anteriorly with 2 stout submedian spines, 1 small me-

dian spine at end of median carina. Labrum normally developed. Paragnath bilobed with lobes separated by median fissure. Thoracic sternites broadening from front to back with 2 submedian blunt spinules on segments 5–6, none on segments 4, 7–8.

Mandible (Fig. 2B, C) robust with short, fused molar and incisor processes. Molar surface with few irregular teeth; incisor thickened with 6 small median teeth. Palp well developed, 3-segmented. Proximal segment without setae; middle segment with 4 small lateral plumose setae, 5 distal plumose setae, plumose seta at distordorsal extremity; distal segment broad, fringed with plumose setae.

Maxillule (Fig. 2D) with slender undivided endopodite bearing 2 lateral, 4 distal plumose setae. Proximal endite moderately broad, somewhat truncate distally with 4 plumose setae laterally; 10 compound spinose setae, 8 simple setae distally. Distal endite slightly broader, rounded distally, bearing 8 compound spinose setae, numerous simple setae.

Maxilla (Fig. 2E) with setose coxal and basal endites. Endopodite long, slender, exceeding anterior margin of scaphognathite, 29 long plumose setae laterally and distally. Scaphognathite long, narrow, fringed with numerous plumose setae.

First maxilliped (Fig. 2F) with 3-segmented endopodite; proximal segment long with 8 long plumose setae laterally; middle segment rounded, about 0.5 length of proximal segment, with 12 long plumose lateral setae, short plumose distomesial seta; distal segment small with minute simple terminal seta. Basipodite large, rounded anteriorly, with straight outer border bearing dense fringe of short plumose setae; coxopodite bilobed, with each lobe bearing numerous short plumose setae. Exopodite well developed, bearing 3 proximal and 32 distal long plumose setae. Large epipod with moderately slender proximal and distal lobes.

Second maxilliped (Fig. 2G) with 4-segmented endopodite. Dactylus suboval with

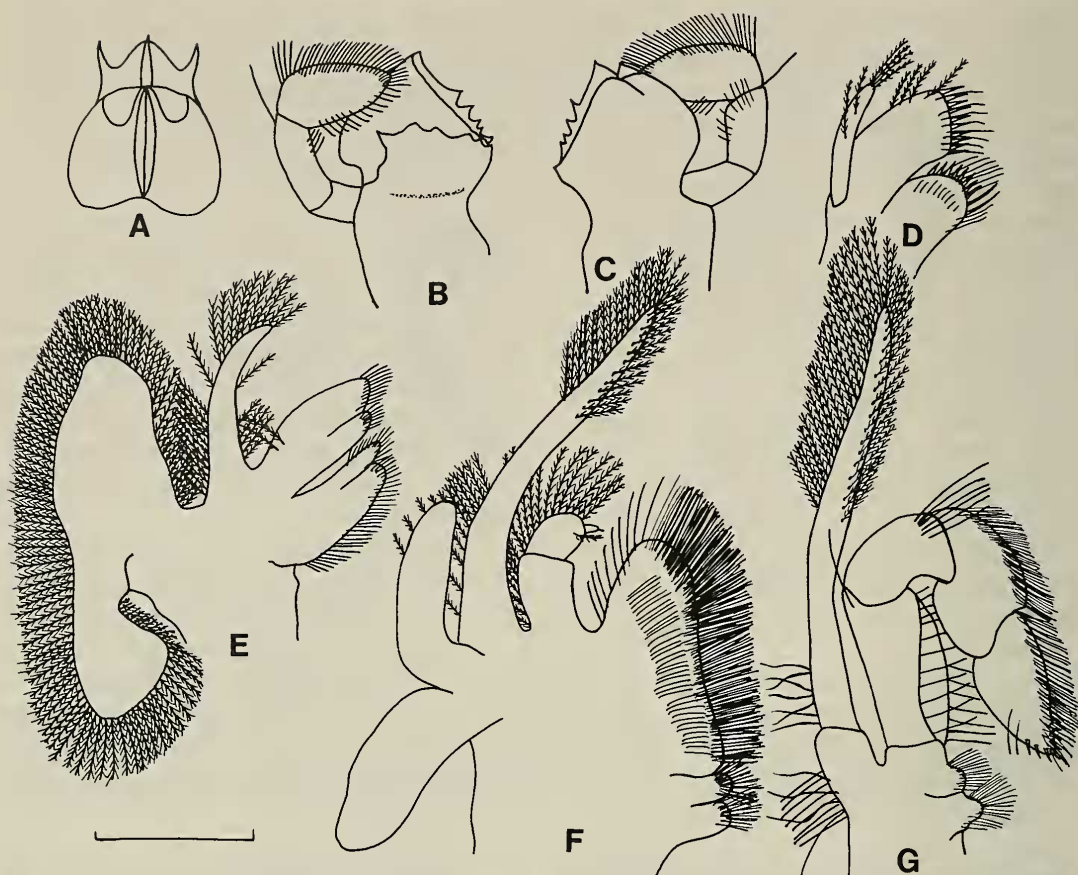


Fig. 2. *Microprosthemella emmiltum*, holotype, female: A, Epistome and labrum, ventral view; B, Mandible, ventral view; C, Mandible, dorsal view; D, Maxillule; E, Maxilla; F, First maxilliped; G, Second maxilliped. Scale bar represents 1.0 mm. Setules not shown on all setae for clarity.

dense fringe of setae along distodorsal margin, 8 compound spinose setae, few simple setae on distal margin. Propodus rounded, about equal in length to dactylus, densely setose on dorsal margin. Carpus short, slightly longer than propodus, with 6 long simple setae at distodorsal angle. Merus 2.0 times length of dactylus, with straight inner border bearing long simple seta distally; outer border convex with numerous long simple setae. Ischium and basis fused into setose lobes; coxa lobate with dense fringe of setae. Exopodite long, slender, undivided with distal $\frac{1}{2}$ bearing 44 long plumose setae, 7 long simple proximal setae. Basipodite with 12 long simple setae.

Third maxilliped (Fig. 3A) endopodite

strongly developed, 5-segmented. Dactylus slender with dense fringe of setae. Propodus slightly longer than dactylus, with numerous simple setae, setiferous organ distally on inner margin. Carpus equal to dactylar length, with numerous simple setae. Merus almost 2.0 times carpal length, robust, with 4 sharp spines, few simple setae on outer margin; inner margin with numerous simple setae. Ischium robust, almost 2.0 times meral length, with 7 sharp spines on outer margin; 3 spines, numerous simple setae on inner margin. Coxa short, rounded, with dense fringe of simple setae. Exopodite long, slender, extending past carpus, with distal $\frac{1}{2}$ bearing 34 long plumose setae.

First pereopod (Fig. 3B) small, slender,

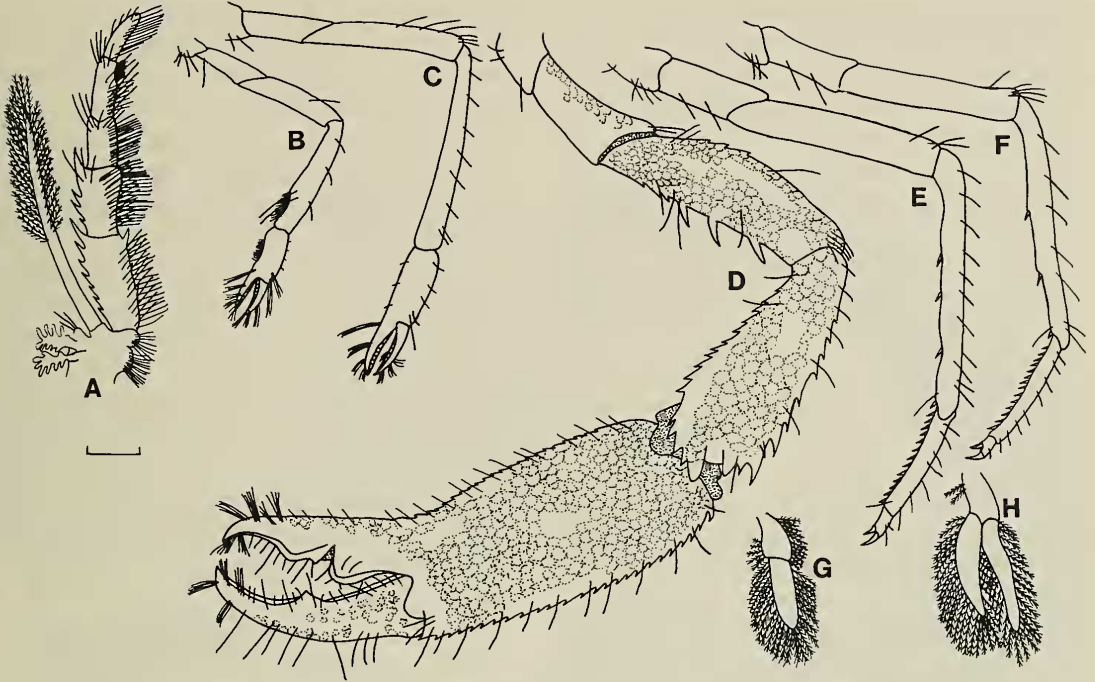


Fig. 3. *Microprosthemella emmiltum*, holotype, female: A, Third maxilliped; B, First pereiopod; C, Second pereiopod; D, Third pereiopod; E, Fourth pereiopod; F, Fifth pereiopod; G, First pleopod; H, Second pleopod. Scale bar represents 1.0 mm. Setules not shown on all setae for clarity.

reaching past scaphocerite, all segments without spines. Fingers slightly compressed, with hooked tips, cutting edges provided with 8 minute peg-like teeth separated by rectangular chitinous lamellae. Fingers and distodorsal extremity of palm bearing small tufts of long setae. Distoventral part of carpus and proximoventral part of propodus provided with setiferous organ, 2 long setae extending over carpal part of organ. Carpus longest segment, about 2.0 times propodal length, merus about 0.7 times carpal length, ischium about 0.5 times carpal length. These segments all bearing few simple setae.

Second pereiopod (Fig. 3C) similarly built as first, including setation, but longer. No setiferous organ present. Carpus longest segment, about 2.0 times longer than propodus, merus slightly longer than propodus, ischium about 0.8 propodal length.

Third pereiopod (Fig. 3D) robust, largest, strongest, reaching with entire carpus be-

yond scaphocerite, covered with minute pits giving surface scaly appearance. Palm of chela longest segment with dorsal crista bearing 25 small spines, numerous simple setae; ventral margin with 23 small spines, numerous simple setae. Fingers elongate, with sharp hooked crossing tips, distally bearing small tufts of long setae. Dactylar cutting edge with large triangular tooth dividing chitinous ridge, fitting into 2 dorsal teeth on propodal cutting edge. Cutting edge of propodus with chitinous ridge bearing sharp tooth, blunt tooth about midlength. Carpus almost as long as propodus, narrowing proximally; dorsal margin with 10 spines; 2 large rounded tubercles, 3 spines at distal margin; ventral margin with 11 spines; few long simple setae on margins. Merus same length as carpus; dorsal margin with 3 small proximal spines, few long simple setae; ventral margin with 3 small proximal spines, 3 long distal spines, few long simple setae.

Ischium short, unarmed except for 2 long simple setae at distodorsal extremity. Basis and coxa short with few long simple setae.

Fourth and fifth pereopods (Fig. 3E, F) long, slender, propodus and carpus undivided. Dactyli biunguiculate with unguis long, slightly curved, separated from dactylar corpus; accessory spine straight, more than 0.5 times length of unguis. Propodi with ventral row of 13–14 movable spines, dorsally with few long simple setae. Carpi longest segments, with 3–4 ventral movable spines, few long simple setae dorsally. Ischia, bases, coxae short, unarmed except for few long simple setae.

First pleopod (Fig. 3G) uniramous, second (Fig. 3H) biramous, all lacking appendices. First pleopod smallest, with exopodite about 2.0 times length of basipodite, margins with dense fringe of plumose setae. Rami of second pleopod 1.5 times length of basipodite, 2 plumose setae on basipodite, margins of rami fringed with plumose setae. Third to fifth pleopods generally similar, third largest of all pleopods, decreasing in size posteriorly.

Branchial formula:

	Maxillipeds			Pereopods				
	I	II	III	I	II	III	IV	V
Pleurobranchs	–	–	1	1	1	1	1	1
Arthrobranchs	1	1	2	2	2	2	2	–
Podobranchs	–	1	–	–	–	–	–	–
Epipods	1	1	1	1	1	1	1	–
Exopods	1	1	1	–	–	–	–	–

Measurements (in mm): The measurements are given for the holotype first followed by the paratypes from smallest to largest in parentheses. Postorbital carapace length, 5.6 (2.8, 4.5, 5.0). Rostral carapace length, 7.3 (4.3, 6.4, 6.7). Total length, approx., 17.5 (11.1, 14.0, 14.3). Length of third pereopod, 17.2 (9.9, –, 14.1).

Coloration: "Few red spots laterally, for greater part colorless. Antennular and antennal flagella also red. Dactyl and propodi of last 2 pairs of legs red but proximal and

distal ends of joints white. Merus of chelipeds red, a longitudinal splash of red on outer side of either palm. Narrower, bark-like on smaller chela." (W. L. Schmitt, unpublished color notes accompanying holotype.) Coloration of the Baja California paratype is based on color photographs of the shrimp immediately after capture. The overall body color is white with carapacial spines, rostrum, abdominal somites, telson, and uropods having a reddish outline. Antennular and antennal flagella and carpi of last 2 pairs of pereopods are deep red. Dactyli, propodi, and meri of fourth and fifth pereopods outlined in red. Third pereopods with seashell pink meri and lower half of palms. First 2 pereopods and mouthparts whitish with pink outlines. Eggs are emerald green.

Paratypes: The new species is slightly variable in the number of body and appendage spines. For example, the smallest specimen (Fig. 4A) has more spines on the carapace and abdominal pleura, but fewer teeth on the uropodal endopodite than the holotype. There are fewer spines on the third pereopod (Fig. 4B) and more spines on the inner ischial margin of the third maxilliped (Fig. 4C) than those of the holotype. Two paratypes have only 4 teeth on the outer margin of the scaphocerite and 2–3 external meral spines on the third maxilliped. All three paratypes were ovigerous with eggs 0.49–0.53 mm in diameter. Eggs early in embryonic development (Fig. 4D) were rounded and yolky, while eggs later in development (Fig. 4E) were elongated with eyed embryos. The egg masses were not large, with the specimens from Taboga having 37 eggs, Baja California 80 eggs and the Galapagos 82 eggs. Some of the morphological differences probably reflect allometric growth changes and normal variation in the species.

Type-localities.—Galapagos Islands, Isla Santa Maria (Floreana), off Black Beach; Taboga Island, Panama; Baja California, Mexico.

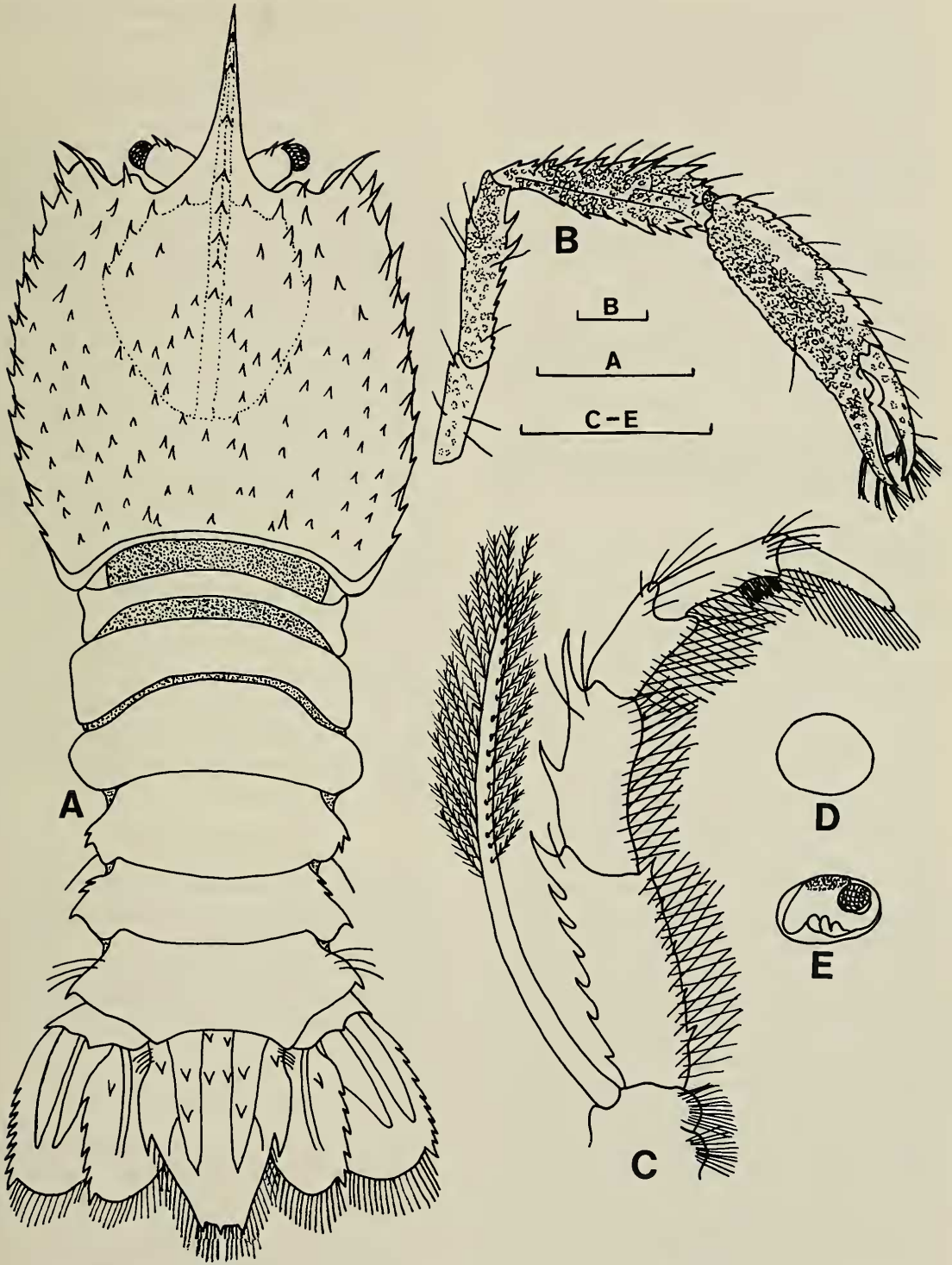


Fig. 4. *Microprosthemella emmiltum*, paratypes, Gulf of California: A, Dorsal view; B, Third pereiopod; C, Third maxilliped; D, Early egg, Galapagos; E, Egg with eyed embryo. Scale bars represent 1.0 mm. Setules not shown on all setae for clarity.

Habitat.—All the specimens were taken in rocky shores with one captured under a rock in sand and rubble substrate. This specimen was collected at a relatively shallow depth of less than 10 m, which is consistent for other members of the genus (Holthuis 1946).

Etymology.—The specific name is derived from the Greek "emmiltos" meaning "red-tinged"; it is given in reference to the coloration of the living animal.

Remarks.—The new species, *Microprosthema emmiltum*, closely follows the definition of the genus *Microprosthema* Stimpson given by Holthuis (1946). It represents another example of a geminate species of decapod crustacean from the eastern Pacific (Abele 1972, 1974). It is most closely related to the western Atlantic *M. semilaeve*, but differs in color, abdomen, uropods, and spination of the pereopods. A complete color description of *M. semilaeve* was given by Manning (1961) and comparison with the new species shows that *M. emmiltum* has both a different overall body color and pattern. In all specimens of *M. semilaeve* (77) examined from the western Atlantic by the author, the second pereopods bear 1–2 meral spines; the third pereopods have numerous spinules on the surfaces of the meri, carpi, propodi and dactyli; the first and second abdominal somites have transverse ridges dorsally; and the dorsal longitudinal ridge of the uropodal endopodite bears 1–2 medial spinules and ends in a spinule. *Microprosthema emmiltum* also resembles the Indo-West Pacific *M. validum* but differs in abdomen, uropods, and body and appendage spination. Several authors have recently identified *Microprosthema* from India and Pakistan coasts as either *M. validum* (Pillai 1962, Tirmizi and Kazmi 1979) or *M. semilaeve* (Mahadevan et al. 1962, Raje and Ranade 1978). I agree with de Saint Laurent and Cleva (1981) that all of these above-mentioned Indian and Pakistan specimens are not *M. validum* or *M. semi-*

laeve but represent an undescribed species of *Microprosthema*.

Other Stenopodids from the Eastern Pacific

A male *Stenopus hispidus* taken from off Taboga Island, Panama (8°47'35"N, 79°33'15"W) was examined by the author. This specimen closely resembles the description and illustrations of *S. hispidus* (Holthuis 1946). However, the telson is abnormally forked with 8–11 spines on each fork. This may have been due to improper healing of an injury, since in all other morphological characters the specimen fits the description of *S. hispidus*. Three other stenopodidean shrimps have so far been collected in the eastern Pacific. *Spongiocoloides galapagensis* was found off the Galapagos Islands at 717 m depth (Goy 1980). *Odonotizona rubra* was collected in shallow waters of the Gulf of California and *O. spongiicola* was found off Santa Catalina Island at 609 m depth (Wicksten 1982). The present records of *Microprosthema emmiltum* and *Stenopus hispidus* brings the total to five species of stenopodidean shrimps known from the eastern Pacific.

Acknowledgments

I am extremely grateful to Dr. R. B. Manning, National Museum of Natural History, Smithsonian Institution, Dr. T. Wolff, Zoologisk Museum, Copenhagen, and Dr. M. K. Wicksten, Texas A&M University for providing me with the specimens used in this study.

Literature Cited

- Abele, L. G. 1972. Comparative habitat diversity and faunal relationships between the Pacific and Caribbean Panamanian decapod Crustacea: A preliminary report with some remarks on the crustacean fauna of Panama.—*Bulletin of the Biological Society of Washington* 2:125–138.
- . 1974. Species diversity of decapod crustaceans in marine habitats.—*Ecology* 55:156–161.

- Goy, J. W. 1980. *Spongicoloides galapagensis*, a new shrimp representing the first record of the genus from the Pacific Ocean (Crustacea: Decapoda: Stenopodidae).—Proceedings of the Biological Society of Washington 93(3):760–770.
- Holthuis, L. B. 1946. Biological results of the Snellius Expedition XIV. The Stenopodidae, Nephropidae, Scyllaridae, and Palinuridae.—Temminckia 7:1–178.
- Mahadevan, S., K. Rangarajan, and C. Sankarankutty. 1962. On two specimens of *Microprosthema* sp. (Decapoda, Macrura) from Palk Bay.—Journal of the Marine Biological Association of India 4: 235–238.
- Manning, R. B. 1961. Observations on *Microprosthema semilaeve* (von Martens) (Decapoda, Stenopodidea) from Florida.—Crustaceana 2(1): 81–82.
- Pillai, N. K. 1962. On the occurrence of *Microprosthema validum* Stimpson in Indian waters.—Journal of the Marine Biological Association of India 3(1–2):267–269.
- Raje, P. C., and M. R. Ranade. 1978. Early life history of a stenopodid shrimp, *Microprosthema semilaeve* (Decapoda; Macrura).—Journal of the Marine Biological Association of India 17(1) 1975 (1978):213–222.
- de Saint Laurent, M., and R. Cleva. 1981. Crustacés Décapodes: Stenopodidea. Pp. 151–188 in Résultats des Campagnes MUSORSTOM. I. Philippines (18–28 Mars 1976), vol. 1. 7. Mémoires ORSTOM, vol. 91, 1981.
- Tirmizi, N. M., and Q. B. Kazmi. 1979. New decapod crustacean records for the northern Arabian Sea.—Crustaceana 36(2):181–185.
- Wicksten, M. K. 1982. Two species of *Odontozona* (Decapoda: Stenopodidea) from the eastern Pacific.—Journal of Crustacean Biology 2(1):130–135.

Department of Biology, Texas A&M University, College Station, Texas 77843.